

The Status of Onsetless Syllables in Kikerewe*

David Odden

1. Introduction

Recent work in prosody has shown that the Onset constraint, which prohibits vowel-initial syllables, plays a fundamental role in explaining a range of phonological phenomena. This paper presents data from the Bantu language Kikerewe, spoken in Tanzania, which illustrate the importance of syllable onsets to this language. Vowels which lack onsets have a special phonological status in Kikerewe. Unlike vowels with onsets, onsetless vowels cannot be long. They have an anomalous pattern of compensatory lengthening under Glide Formation, and they cannot bear tone. The goal of this paper is to demonstrate the extent to which onsetless syllables have a special status in Kikerewe, and to provide a theoretical explanations for these special properties. The hypothesis which will be set forth is that onsetless vowels do not in fact define syllables.

The observation that syllables prefer to have onsets has a venerable status in phonological theory. Jakobson (1962) makes this observation; Steriade (1982), Clements & Keyser (1983) and Hyman (1985) build this principle into their algorithms for syllabification. Ito (1986) and (1989) similarly acknowledges the strong tendency for languages to require syllable onsets. McCarthy & Prince (1993) argue that, apart from stating a preference for CV syllables over V syllables, the Onset constraint interacts with other

* Research for this paper was supported in part by NSF Grant SBR-9421362. I would like to thank Deo Tungaraza and F. Magayane for providing data on Kikerewe. Earlier versions of this paper were presented at the University of Illinois, University of Pennsylvania, and MOT at the University of Ottawa.

phonological principles, and they exploit the Onset constraint in explaining phonologically conditioned patterns of infixation in Timugon Murut and other languages. Rosenthal (1994) argues that the Onset constraint can be called on to explain the existence of Glide Formation and other hiatus-resolving phonological principles. Downing (1993, 1994, 1995) shows that this constraint is relevant to problems in stress, tone and reduplication in a variety of languages.

Kikerewe stands out among languages which strongly obey the Onset constraint in providing multiple lines of evidence which bear on the constraint. Particularly important is the fact that onsetless vowels exhibit anomalous prosodic properties which are related only in that they occur in conjunction with an onsetless vowel.

2. Resolution of hiatus

Phonetically onsetless syllables in this language have a very limited occurrence; they appear only at the beginning of the utterance, as indicated in (1).

- | | | |
|-----|---------|--------------------------|
| (1) | akalima | 'he cultivated (remote)' |
| | echaála | 'finger' |
| | igogo | 'tree trunk' |
| | olíma | 'you (sg.) cultivate' |

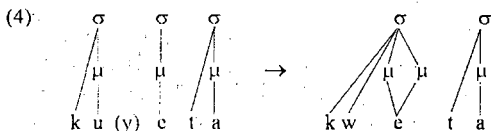
One consequence of the ban on onsetless syllables in Kikerewe is that whenever vowel sequences would arise by morphemic or syntactic concatenation, the second would-be onsetless syllable is provided an onset by syllabic fusion. This onset is provided either by turning the first vowel into a glide which serves as an onset, or by otherwise merging the two syllables into one, thereby eliminating the second onsetless syllable. In (2), the examples on the left contain the noun class prefixes *ebi*, *omu* and *olu* before a consonant-initial stem; this column reflects the underlying form. On the right, the same prefixes stand before a vowel-initial stem, and in that case the underlyingly prevocalic high vowel of the prefix becomes a glide, with compensatory lengthening of the second vowel. By fusing the two syllables into one, the onset of the leftmost underlying syllable thereby provides an onset for the second vocalic segment.

- | | | | | | |
|-----|-----------|-------------|-----------|------------|--------------|
| (2) | ebi-tooke | 'bananas' | /ebi-ála/ | → eby-áála | 'fingers' |
| | omu-tima | 'heart' | /omu-aga/ | → omw-aaga | 'compulsion' |
| | olu-bíbo | 'fish trap' | /olu-íle/ | → olw-ííle | 'sky' |

Further examples of hiatus resolution by glide formation can be seen in (3). Stem initial *y* deletes optionally in Kikerewe, and this might result in a sequence of vowels and therefore a violation of the Onset constraint. However, the first vowel merges with the second, giving a single long syllable. Thus, underlying /ku-yeta/ would become *kueta* by *y*-deletion. The expected vowel-vowel sequence is eliminated by glide formation.

- | | | | |
|-----|---------------|-------------|-------------------------|
| (3) | ku-yeta | kweeta | 'to call' |
| | tu-yaníká | twaaníká | 'we spread' |
| | eli-yóma | elyóoma | 'it will dry' |
| | tu-yi-teekélá | twiiteekélá | 'we call for ourselves' |

Fusing the two syllables into one eliminates the second onsetless syllable, and with it, the violation of the Onset constraint.



In case the first vowel of a would-be divocalic sequence is *a*, the hiatus is removed by segmentally merging the two vowels into one nonhigh vowel. This is illustrated in (5) with stems beginning with *y*. On the left is given the variant retaining *y*, and on the right is the variant without *y*, showing the effect of vowel merger, driven by the need to eliminate violation of the Onset constraint.

- | | | | |
|-----|-------------|-----------|-------------------------|
| (5) | ga-yelécélá | geelécélá | 'they (cl. 6) float' |
| | ba-yíbá | béébá | 'they steal' |
| | ba-yoléká | booléká | 'they point' |
| | baka-yéta | bakééta | 'they called' |
| | akagá-yómya | akagóómya | 'he dried them (cl. 6)' |

There is also resolution of vocalic hiatus at the phrasal level. When any vowel-initial word is preceded by another word, the two vowels coalesce into one long syllable.

- | | | |
|-----|----------------------|-------------------------|
| (6) | ekaluumbeta | 'trumpet' |
| | nkabala | 'I counted' |
| | nkabal' eekaluumbeta | 'I counted the trumpet' |
| | omuuntu | 'person' |
| | akabala | 'he counted' |
| | omutw' aakabala | 'the person counted' |

This brings up the first complication introduced by onsetless vowels. Underlying V+V exceptionlessly results in syllable merger and almost always results in compensatory lengthening of the surviving vowel. The data in (7a) show the underlying form of the 1 pl. and Class 8 subject prefixes, *tu* and *bi*. The examples in (7b) show that when these prefixes are followed by the tense prefix *a*, the vowel of the subject prefix desyllabifies and *a*-compensatorily lengthens.

- (7) a. tu-tééká 'we cook (hab.)'
 bi-téékwá 'they (cl. 8) are cooked (hab.)'
 tu-ka-tééka 'we cooked (rem.)'
 bi-ka-tééka 'they (cl. 8) were cooked (rem.)'
 b. tw-aa-tééká 'we just cooked'
 by-aa-téékwá 'they (cl. 8) were just cooked'
 ti-tw-áá-téeka 'we didn't just cook'
 ti-by-áá-téekwa 'they (cl. 8) weren't just cooked'

However, there is a context where there is no compensatory lengthening, and that is when the first vowel is onsetless. The data in (8) show that when the subject prefix is vowel initial, there is no compensatory lengthening of *a*, even though there is glide formation. The data in (8a) show that the 2 sg. and Class 9 subject prefixes are respectively *o* and *e*. When followed by the past tense prefix *-a-* in (8b), these vowels become glides, but unlike the situation in (7), there is no lengthening of *-a-*.

- (8) a. o-tééká 'you sg. cook (hab.)'
 e-téékwá 'it (cl. 9) is cooked (hab.)'
 o-ka-tééka 'you sg. cooked (rem.)'
 e-ka-téékwá 'it was cooked (rem.)'
 b. w-a-tééká 'you sg. just cooked'
 y-a-téékwá 'it was just cooked'
 ti-w-átéeka 'you sg. didn't just cook'
 ti-y-á-téekwa 'it (cl. 9) was not just cooked'

Another context where an onsetless vowel becomes a glide without compensatory lengthening of the following vowel is when a nominal class agreement prefix is placed before the associative prefix *-a-* 'of'. The examples in (9a) show the underlying forms of the nominal agreement prefixes *gu-* 'cl. 3', *li-* 'cl. 5', *o-* 'cl. 1' and *e-* 'cl. 9'. Data in (9b) show that when combined with the prefixes *gu* or *li* which have onsets, the agreement prefix fuses syllabically with the associative prefix *a* resulting in a long vowel. Finally, the data in (9c) show that the prefixes *o* and *e* become glides in this context, but without lengthening of the associative prefix *-a-*.

- (9) a. gu-lí'í'yá 'that (cl. 3)' gú-nu 'this (cl. 3)'
 li-lí'í'yá 'that (cl. 5)' lí-nu 'this (cl. 5)'
 o-lí'í'yá 'that (cl. 1)' ó-nú¹ 'this (cl. 1)'
 e-lí'í'yá 'that (cl. 9)' é-nú 'this (cl. 9)'
 b. gw-aa-Bulemo '(cl. 3) of Bulemo'
 ly-aa-Bulemo '(cl. 5) of Bulemo'

¹ The tonal variation in the form of the demonstratives is also connected with the onsetless status of these prefixes, as discussed in section 4.

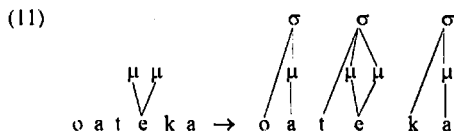
- c. w-a-Bulemo ' (cl. 1) of Bulemo'
 y-a-Bulemo ' (cl. 9) of Bulemo'

The question is how to explain this lapse in the otherwise exceptionless pattern that there is always compensatory lengthening associated with glide formation. This lapse is not a general property of glide formation and onsetless vowels in all languages since, for example, in Kimatuumbi (see Odden 1995) when a prevocalic high vowel becomes a glide, the following vowel compensatorily lengthens, and therefore /u-a-téijike/ becomes [waatéijike] 'you sg. cooked (remote)'.

The general pattern in Kikerewe, indeed in almost all languages, is that within a morpheme, each vowel projects at least one mora which forms the nucleus of a syllable. Thus where there is an underlying sequence of two consecutive vocalic elements in /tu-a-teeka/, core syllabification forms a syllable on *tu*, and Glide Formation applies to that, with compensatory lengthening of *a*.



Building a syllable in this manner when the vowel is onsetless is generally problematic since it results in a violation of the Onset constraint, and doing this for a vowel sequence like *oa* is doubly so, since it would result in two violations of the constraint. A better solution is to allow *o* to function as the onset of a syllable, by directly grouping both segments into a CV syllable by core syllabification.



A similar asymmetry in the compensatory lengthening concomitant of glide formation between V+V and CV+V sequences is also found in North Kyungsang Korean (Kim 1995), which is also explained in terms of the contrast between core syllabification versus glide formation affecting syllabified vowels. The alternation between glide and vowel is governed by two mechanisms in Kikerewe; the choice of which mechanism to employ in syllabifying underlying vowel sequences is dictated by the desire to minimize violations of the Onset constraint.

3. Long vowels and onsetless syllables

Another way in which the Onset constraint is involved in explaining anomalous phonological behavior is seen in the fact that Kikerewe disallows long onsetless vowels. There are contexts where one would have expected to find such long vowels, but they do not exist. For example, it is a general principle in the language that any vowel which precedes a sequence composed of a nasal plus a consonant must be long. Without exception, any vowel within a stem is long when it is followed by a such a sequence.

(12)	omukuundi	'navel'	obuluunda	'smallpox'
	ekigaambo	'word'	ekihíinzú	'piece'
	ekikóómbe	'cup'	ekipáanga	'knife'
	enaanza	'lake'	ibaanza	'debt'
	iboondo	'larynx'	iháángá	'clan'
	ihéembe	'cow horn'	ekituungánwá	'livestock'
	akalééngéetuko	'slope'	ekiteendeegwe	'type of bean'

But if a vowel both precedes a nasal+consonant sequence and is also utterance-initial, then the vowel remains short.

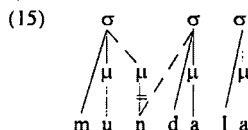
(13)	embaata	'duck'	embógó	'buffalo'
	embúzi	'goat'	éndosyo	'dipping spoon'
	endálá	'leopard'	endezu	'beard'
	endíilo	'relish'	engaamba	'language'
	engezi	'flood'	engiingo	'body'

The requirement that vowels are always long before nasal plus consonant results in phonological alternations. The locative prefixes *mu* and *ha* have an underlying short vowel, as (14a) shows. When these prefixes precede a noun stem which begins with a nasal plus consonant sequence in (14b), the vowel of the prefix becomes long.

(14)	a.	mu-chúumba	'in the room'
		ha-chúumba	'at the room'
		mu-mabáále	'in the stones'
		ha-mabáále	'at the stones'
	b.	muu-ndálá	'in the leopard'
		haa-mbúzi	'at the goat'
		muu-mpéte	'in the ring'
		haa-ndíilo	'at the relish'

Lengthening the prefixal syllable of *muundálá* can be straightforwardly accounted for. It is assumed that all preconsonantal nasals in Kikerewe are underlyingly moraic, as they are in most Bantu languages. However, nasals cannot serve as syllable peaks on the surface, and since there are no codas in the language, the nasal must syllabify as part of the

onset of the following syllable. It therefore abandons its mora, which attaches to the previous syllable.



As (16) shows, when the same NC-initial nouns are preceded by the onsetless vowel *e*, that vowel does not lengthen.

- (16)
- | | | | |
|---------|-----------|----------|----------|
| e-ndálá | 'leopard' | e-mbúzi | 'goat' |
| e-mpété | 'ring' | e-ndiilo | 'relish' |

The failure of the vowel to lengthen in this context is due to the ban on long onsetless vowels.

Additional examples illustrate the fact that onsetless vowels do not lengthen. The data in (17a) demonstrate the underlying short vowels of the prefixes *ka*, *ba* and *li*, and the data in (17b) show lengthening of the vowel in these prefixes before an NC sequence, involving the 1 sg. object prefix *-n-*.

- (17)
- | | | |
|----|------------------|---------------------|
| a. | a-ka-chúmítá | 'he stabbed' |
| | ba-chúmítá | 'they stab' |
| | ba-li-chúmítá | 'they will stab' |
| b. | a-kaa-n-chúmítá | 'he stabbed me' |
| | baa-n-chúmítá | 'they stab me' |
| | ba-lii-n-chúmítá | 'they will stab me' |

The examples in (18) show that when a vowel initial prefix precedes a nasal+consonant sequence, that vowel is not lengthened.

- (18)
- | | |
|---------------|------------------|
| a-n-chumítá | 'he stabs me' |
| o-n-chumítá | 'you stab me' |
| a-n-chumisílé | 'he stabbed me' |
| o-n-chumisílé | 'you stabbed me' |

There is one last point to be made regarding vowel lengthening before NC sequences, as shown in (19), and that is that the effect is found at the phrasal level².

² Presumably, there would be lengthening at the phrasal level only if the target vowel is preceded by a consonant. However, there are no words in Kikerewe composed of a single vowel, so this prediction cannot be tested.

- | | | | |
|------|-------------------|--|-------------------------------|
| (19) | ndalá kí | | 'which leopard' |
| | akabala | | 'he counted' |
| | akabalaa ndalá kí | | 'which leopard did he count?' |

Illustration of the restriction against onsetless long vowels is not limited to the context of a following sequence of nasal plus consonant. The present tense prefix *-ku-* optionally deletes, as shown in (20), resulting in compensatory lengthening of the vowel in the preceding subject prefix.

- | | | | |
|------|---------------|-------------|---------------------------------|
| (20) | tu-ku-bábála | tuu-bábála | 'we are counting them' |
| | ba-ku-múlúuba | baa-múlúuba | 'they are following him' |
| | mu-ku-túbúuta | muu-túbúuta | 'you pl. are choking us' |
| | zi-ku-bálúma | zii-bálúma | 'they (cl. 10) are biting them' |

However, just in case the preceding subject prefix lacks an onset consonant, there is no lengthening.

- | | | | |
|------|-------------|----------|-----------------------------|
| (21) | a-ku-múbála | a-múbála | 'he is counting him' |
| | o-ku-túlóla | o-túlóla | 'you are looking at us' |
| | e-ku-bálúma | e-bálúma | 'it (cl. 9) is biting them' |

There is one final context which actively demonstrates that onsetless vowels may not be long. The noun class agreement prefix which appears before the stem *-ha* 'which?' has a long vowel providing that the prefix syllable has an onset; if the prefix is composed of a simple vowel, the prefix remains short.

- | | | | | |
|------|--------|------------------|--------|------------------|
| (22) | báá-há | 'which (cl. 2)?' | gúú-há | 'which (cl. 3)?' |
| | zíí-há | 'which (cl. 4)?' | líí-há | 'which (cl. 5)?' |
| | ó-há | 'which (cl. 1)?' | é-há | 'which (cl. 9)?' |

We will delay considering the explanation for this constraint on long vowels until section 7, after we have considered the full range of phonological issues related to the Onset constraint.

4. Tone and onsetless vowels

A third special property of onsetless vowels is that they cannot bear (H) tone.³ As background to considering the tonal evidence, it should be noted that any H tone spreads to the following syllable provided that it is toneless, by a Tone Doubling process. The

³ As is typical in Bantu languages, Kikereve presents an opposition between H toned and toneless syllables, rather than H toned and L toned syllables. A privative tonal contrast between H and Ø will thus be assumed.

data in (23) show that the verb stems *bala* and *buuka* are toneless, but when they are preceded by a H toned prefix such as *tu*, the H of the prefix spreads to the verb root.

- | | | | | |
|------|----------|------------|-------------|---------------|
| (23) | ku-bala | 'to count' | ku-tú-bála | 'to count us' |
| | ku-buuka | 'to comb' | ku-tú-búuka | 'to comb us' |

In general, any H tone in the language spreads one syllable to the right, unless that H tone is in the phrasal penult (cf. *kubóha* 'to tie', *kubóhá Bulemo* 'to tie Bulemo'). The effect of Tone Doubling will be seen throughout the data.

The surface tone which appears on a verbal subject prefix is a function of morphosyntactic properties interacting with phonological constraints. In subordinate clauses, the subject prefix is generally H toned. The examples in (24) show that in various relative clause forms of the verb, there is an underlying H tone on the subject prefix, which is *ba* in these examples.

- | | | |
|------|------------------|--------------------------------|
| (24) | a-bá-kú-luunduma | 'they who are growing' |
| | a-bá-lúúnduma | 'they who growl' |
| | a-bá-lúúndumile | 'they who growled (yesterday)' |

Data in (25) show that the subject prefix (*ba*, *tu*, *bi*) in the conditional is also H toned.

- | | | |
|------|----------------|-------------------------|
| (25) | bá-ká-luunduma | 'if they growl' |
| | tú-ká-luunduma | 'if we growl' |
| | bí-ká-luunduma | 'if they (cl. 8) growl' |

In (26) it can be seen that when the subject prefix is one of the onsetless prefixes *o-* '2 sg.', *a-* '3 sg. human' or *e-* 'cl. 9', the subject prefix does not bear a H tone. Instead, the syllable which follows the subject prefix bears the H tone.⁴

- | | | |
|------|---------------|--|
| (26) | a-kú-lúúnduma | 'he who is growing' |
| | e-kú-lúúnduma | 'it (cl. 9) which is growing' |
| | a-lúúndúma | 'he who grows' |
| | e-lúúndúma | 'it (cl. 9) which grows' |
| | a-lúúndúmile | 'he who growled (yesterday)' |
| | e-lúúndúmile | 'in (cl. 9) which growled (yesterday)' |
| | o-ká-lúúnduma | 'if you sg. growl' |
| | a-ká-lúúnduma | 'if he grows' |

⁴ The relative clause form of the verb is composed of a head marker which is a nonhigh copy of the following subject prefix's vowel, viz. *a-bá-lúúnduma* 'they who growl', *e-ki-lúúnduma* 'it (cl. 7) which grows', *o-gú-lúúnduma* 'it (cl. 3) which grows'. One would expect the underlying forms of the 3 sg. and cl. 9 subject forms of this verb to be /e-e-luunduma/ and /a-a-luunduma/. These vowel sequences must be eliminated, which would normally lead to a single long vowel. However that vowel would be onsetless, so therefore the vowel surfaces as short.

Thus the H tone remains on the subject prefix in *abákúluunduma* since the subject prefix has an onset, but it must shift to the aspect prefix *ku* in *akúlúunduma* since the subject prefix is onsetless and thus cannot bear tone because of its special prosodic status.

In certain noun classes, the agreement prefix for numerals bears a H tone, and yet for other classes the numeral prefix is toneless, as the data in (27) demonstrate.

- | | | | | |
|------|---------|--------------|--------|--------------|
| (27) | bá-bíli | '2 (cl. 2)' | i-bili | '2 (cl. 4)' |
| | bí-bíli | '2 (cl. 8)' | a-bili | '2 (cl. 6)' |
| | tú-bíli | '2 (cl. 13)' | i-bili | '2 (cl. 10)' |

Notice that it is precisely those agreement prefixes which are onsetless that do not bear a H tone.

Other evidence shows that onsetless vowels cannot bear tone. Nouns in Kikerewe typically have a class prefix with the shape VCV, i.e. *omu* in *omu-gela* 'river' or *emi* in *emi-gela* 'rivers'. The first vowel in this structure is generally referred to as the pre-prefix, and is a non-high copy of the prefixal vowel (or *e* if the prefix contains no vowel). The distribution of the pre-prefix morpheme is governed by semantic and syntactic properties. The pre-prefix is not used on proper names (cf. *Buzúne*, *Bulemo*), and it is also lacking when a noun is modified by a *wh*-word, cf. *omugela* 'river', *mugela ki* 'which river?'. In addition, some nouns are lexically marked for not taking a preprefix, for example *liibuléla* 'hawk'.

In (28) we find examples of the instrumental prefix *na* appearing before various nouns which lack a preprefix. In these examples, the syllable of the instrumental prefix has no H tone.

- | | | | | |
|------|-----------|---------------|--------------|------------------|
| (28) | Buzune | (proper name) | na-Buzúne | 'by Buzune' |
| | mugelá ki | 'which river' | na-mugelá ki | 'by which river' |
| | liibuléla | 'hawk' | na-liibuléla | 'by a hawk' |

In contrast, when a noun has a preprefix, the preprefix vowel fuses with that of the instrumental prefix. In addition, there is an apparently inexplicable H tone on the syllable of the instrumental prefix.

- | | | | | |
|------|-----------|----------|--------------|---------------|
| (29) | o-mu-gela | 'river' | n-óó-mú-gela | 'by a river' |
| | o-mw-áana | 'child' | n-óó-mw-áana | 'by a child' |
| | e-mí-hyó | 'knives' | n-éé-mí-hyó | 'with knives' |

This can be explained under the hypothesis that the pre-prefix has an underlying H tone, so *omugela* is underlyingly /óomugela/. Since the pre-prefix is usually in a syllable which lacks an onset, that H tone cannot dock to the vowel of the pre-prefix, and therefore the

H tone is lost. However, in case an instrumental prefix is added, the H tone can be realised on the pre-prefix syllable since the instrumental prefix provides an onset consonant.

Having shown that onsetless vowels are not proper tone bearing units, it is important to clarify that onsetless vowels are excluded from bearing tone only with respect to word level phonological phenomena. Whenever a H tone stands at the end of the utterance, it spreads leftward to the preceding syllable, which results in alternations between the prepausal and phrase medial forms of words. (30) gives words which underlyingly have a single H on the final vowel. On the left can be seen the phrase-medial form, where that H is the only H within the word. On the right is the same word prepausally, illustrating the effect of tone throwback.

- | | | | | |
|------|--------------------|---------------------------|--------|-----------|
| (30) | endálá yáange | 'my leopard' | endálá | 'leopard' |
| | ekihyó kilaandúúba | 'the herd will follow me' | ekihyó | 'herd' |

An important fact, shown in (31), is that prepausal H will spread leftward even to an onsetless vowel.

- | | | | | |
|------|--------------|-----------------|-------|--------|
| (31) | embwá yáange | 'my dog' | émbwá | 'dog' |
| | ití likagwa | 'the tree fell' | ití | 'tree' |

Therefore, as far as phrase level tone spreading is concerned, an onsetless vowel is indeed a legitimate tone bearer.

Further exemplification of the fact that onsetless vowels cannot bear tone (except due to phrase level leftward spreading) can be seen in the form of certain nominal prefixes. As the following data show, the noun class agreement prefix for 'what kind' has a H tone if the prefix has an onset consonant (this H spreads rightward by Tone Doubling). If the agreement prefix lacks an onset consonant, the prefix has no H and instead H appears on the stem *-tá*. These examples illustrate the nonprepausal pronunciation.

- | | | | | |
|------|----------|---------------------|----------|----------------------|
| (32) | gú-tá... | 'what kind (cl. 3)' | kí-tá... | 'what kind (cl. 7)' |
| | gá-tá... | 'what kind (cl. 6)' | zí-tá... | 'what kind (cl. 10)' |
| | e-tá... | 'what kind (cl. 9)' | a-tá... | 'what kind (cl. 1)' |

The prefixes for demonstrative agreements have an analogous variation between having H tone and being toneless, as the following utterance medial variants show.

- | | | | | |
|------|----------|-----------------|----------|----------------|
| (33) | bá-nú... | 'those (cl. 2)' | kí-nú... | 'that (cl. 7)' |
| | o-nú... | 'that (cl. 1)' | e-nú... | 'this (cl. 9)' |

The surface shape of the noun class agreement prefix on the modifier 'some' simultaneously illustrates that an onsetless vowel cannot bear tone, and also further exemplifies the prohibition against long onsetless vowels.

- | | | | | |
|------|-----------|-----------------|-----------|-----------------|
| (34) | a-báá-ndi | 'some (cl. 2)' | e-kíí-ndi | 'some (cl. 7)' |
| | o-lúú-ndi | 'some (cl. 11)' | a-káá-ndi | 'some (cl. 12)' |
| | ó-ndí ~ | 'some (cl. 1)' | é-ndí ~ | 'some (cl. 9)' |
| | o-ndí... | | e-ndí... | |

The stem 'some' is underlyingly *-ndi*, and since the stem begins with an NC cluster, the preceding vowel must be lengthened. In addition, the agreement prefix attached to this stem is H toned. However, the language disallows the second of a sequence of underlyingly adjacent H tones from surfacing, and therefore the H tone of the stem is deleted in *a-báá-ndi* from *a-báá-ndi*.⁵ Note also that the agreement prefix is preceded by the pre-prefix vowel. In the forms *ondi* and *endi*, the agreement prefix is onsetless, and therefore it cannot be long. Normally, the NC sequence would cause lengthening of the preceding vowel; furthermore the sequence of two vowels in underlying /o+o/ and /e+e/ (the first vowel being the pre-prefix and the second being the agreement prefix) would fuse into a long vowel if there were an onset consonant. The onsetless prefix vowel also cannot bear H tone, so there is no sequence of H tones, and therefore the underlying H of the stem *ndi* is retained.

5. Deletion of y

This section considers another phonological problem which is related to the prohibition against onsetless syllables in Kikerewe, namely the constraints on deletion of *y*. It was noted in section 2 that stem-initial *y* deletes optionally. The data in (35) provide additional cases of this deletion of *y*. The underlying form of relevant words is directly reflected in the surface form on the left, where *y*-deletion does not apply. In the variant on the right, *y* has deleted, which alone would result in a vowel cluster and a violation of the Onset constraint. The offending onsetless syllable is removed by general processes of vowel merger.

- | | | | |
|------|-------------|----------|---------------|
| (35) | ba-ka-yéta | bakééta | 'they called' |
| | ba-ka-yómya | bakóómya | 'they dried' |
| | ba-ka-yíba | bakééba | 'they stole' |
| | ba-yéta | bééta | 'they call' |
| | ba-yómyá | bóómyá | 'they dry' |
| | ba-yíba | béébá | 'they steal' |

The same point is made in (36), which contains examples of the 1 pl. subject prefix *tu* whose vowel becomes *w* before another vowel, providing that *y* has deleted.

⁵ Multiple adjacent H toned syllables appear freely in words, e.g. *ónú* 'this (cl. 1)'. However those syllables bear a single H tone which is multiply linked, due to postlexical tone spreading.

- | | | | |
|------|------------------------|-----------------------|------------|
| (36) | tu-yé ^h tá | twéé ^h tá | 'we call' |
| | tu-yó ^h myá | twóó ^h myá | 'we dry' |
| | tu-yí ^h bá | twéé ^h bá | 'we steal' |

The examples in (37) show that if the stem is preceded by the vowel-initial prefixes for second singular or class 9 subjects, *y* may delete, and the vowel of the subject prefix then becomes a glide, in order to give the resulting syllable an onset.

- | | | | |
|------|-----------------------|----------------------|-------------------------|
| (37) | o-yé ^h tá | wéé ^h tá | 'you sg. call' |
| | o-yí ^h bá | wíí ^h bá | 'you sg. steal' |
| | e-yí ^h bwá | yíí ^h bwá | 'it (cl. 9) was stolen' |

In contrast, the data of (38) show that after the 3 sg. subject prefix *a*, *y* may not delete.

- | | | | |
|------|-----------------------|-------------|---------|
| (38) | a-yé ^h tá | 'he calls' | *(e)eta |
| | a-yó ^h myá | 'he dries' | *(o)oma |
| | a-yí ^h bá | 'he steals' | *(e)eba |

The reason why *y* cannot delete after this vowel initial prefix, but can delete after other vowel initial prefixes in (37), is that when preceded by /e/ or /o/, the vowel of the subject prefix can be desyllabified to form the onset of the syllable containing the stem initial vowel. It is impossible to make *a* be a syllable onset, so deletion of *y* would result in unresolvable vowel hiatus. Thus *y*-deletion is blocked after the third singular prefix *-a-*.

The picture is more complex, as becomes clear upon consideration of the role of the past tense prefix *-a-*. The examples in (39) show that while the 3 sg. subject prefix is generally *a*, when it precedes the tense prefix *-a-*, it appears as *y*.

- | | | |
|------|------------------------|--------------------------|
| (39) | a-ka-bala | 'he counted' |
| | a-bazí ^h lé | 'he counted (yesterday)' |
| | y-a-bálá | 'he just counted' |

This allomorphy no doubt has a functional explanation. Given the expected underlying form of the recent past tense form, /a-a-balá/, what would surface is [abálá] (given that a long vowel cannot surface in word-initial position). Such a form exists, but it is the habitual form 'he counts' (cf. [tubálá] 'we count'). The selection of the allomorph *-y-* for the 3 sg. recent past avoids an otherwise systematic neutralization between the habitual and recent past.

Up to this point, *y*-deletion has been blocked from applying after the 3 sg. subject prefix *a-*, the reason being that this prefix lacks an onset consonant, so deleting *y* would worsen the situation with respect to violations of the Onset constraint. Since the *y* allo-

morph has an onset consonant, *y*-deletion should be allowed if the 3 sg. subject prefix is followed by the prefix *-a-*, and the data in (40) show that it is.

- | | | | |
|------|-------------------|----------------|---------------------|
| (40) | <i>y-a-yésile</i> | <i>yéesile</i> | 'he called (today)' |
| | <i>w-a-yésile</i> | <i>wéesile</i> | 'you called' |

Another restriction on *y*-deletion is that it cannot apply if the preceding syllable is long. Consider the examples in (41). Here, a long syllable precedes *y* and *y* cannot delete.

- | | | | |
|------|-------------------------|------------------------------|---------------------|
| (41) | <i>a-ba-tá-á-yésile</i> | 'they who didn't call (rem)' | * <i>abatécsile</i> |
| | <i>ba-ch-áá-yéta</i> | 'they are still calling' | * <i>bachééta</i> |
| | <i>ti-b-áá-yésile</i> | 'they didn't call (rem)' | * <i>tibécsile</i> |

The impossibility of *y*-deletion in this case is again the result of the Onset constraint interacting with a constraint that processes of syllable destructuring such as syncope and glide formation do not destroy long syllables.⁶ The effects of this constraint in Kikerewe can be seen when the present tense prefix *ku* optionally deletes, a phenomenon discussed in section 3. Deletion of *ku* is prohibited in (42), where the prefix *ku* precedes the 1 sg. object prefix */-n-/*. Recall that preconsonantal *n* desyllabifies and compensatorily lengthens the preceding vowel, as indicated in section 3.

- | | | | |
|------|----------------------|----------------------|----------------------------|
| (42) | <i>bakuuntéékéla</i> | * <i>baantéékéla</i> | 'they are cooking for me' |
| | <i>mukuundúúba</i> | * <i>muundúúba</i> | 'you pl. are following me' |

Since the syllable *ku* is long in this context, it cannot be deleted, due to the constraint against destructuring a long syllable.

The failure of *y*-deletion after a long vowel can be explained in terms of this constraint against destructuring long syllables in conjunction with the principle that syllables must have onsets. If *y* were deleted in (43), an onset violation would result. The option of fusing the two syllables into one is not available, since doing so would require destruction of a long syllable. Therefore the only solution is to block *y*-deletion.

- (43)
-

It is possible for *y* to delete after the tense prefix *-a-*, but only in case that vowel heads a short syllable. Furthermore, the syllable containing *a* will be short only in case the preceding subject prefix was onsetless. If the preceding subject prefix has an onset

⁶ See Odden (1995) for examples of the inalterability of long syllables in Kimatumbi.

consonant, one finds standard glide formation and compensatory lengthening of *a*. The only way for *a* to be short is if the subject prefix vowel directly syllabifies as the onset of the syllable by core syllabification, which happens only when that prefix is onsetless.

- | | | | | |
|------|----------|------------------|--------|------------------|
| (44) | twaaýétá | 'we just called' | wayétá | 'he just called' |
| | *twéétá | | wéétá | idem |

Another context where deletion of *y* is blocked is when *y* is word initial. As shown by the examples in (45), *y*-deletion is impossible in the imperative, where the stem is word initial.

- | | | | |
|------|----------|------------|----------------------|
| (45) | yé!á | *é!á | 'call!' |
| | yaandíka | *(a)andíka | 'write!' |
| | yaníka | *aníka | 'spread out to dry!' |
| | yoyéla | *oyéla | 'sweat!' |

Again, this follows from the pattern previously seen, namely that deletion of *y* is possible only in case the vowel to the right can be preceded by an onset at the surface.

6. Summary of anomalous patterns

To summarise the status of onsetless syllables in Kikerewe, it has been shown that what appear to be onsetless syllables exist only in utterance initial position. Whenever two underlying vowels are concatenated, they fuse into one syllable, with compensatory lengthening, so /tu-a-bálá/ becomes [twaabálá] 'we counted'. However, if the first syllable is onsetless, there is no compensatory lengthening and the resulting syllable is monomoraic, and thus /o-a-bálá/ becomes [wabálá] 'you counted'. This difference in the compensatory lengthening concomitant of glide formation exists for underlying sequences of onsetless vowel plus vowel, but derived vowel sequences which arise by deletion of *y* always have compensatory lengthening, even when the first vowel is onsetless, thus /o-yé!á/ surfaces as [wéé!á] 'you call' and /tu-yé!á/ surfaces as [twéé!á] 'we call'. Deletion of *y* is constrained so that it does not increase the number of violations of the Onset constraint, explaining why deletion is barred in {ayé!á} 'he calls'. Onsetless vowels also cannot be compensatorily lengthened by the mora of a preconsonantal nasal as shown by [endálá] 'leopard'; and finally, onsetless vowels cannot be tone bearing units at the word level, though they may be TBU's postlexically.

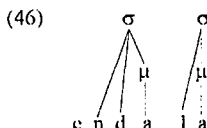
7. Explaining the anomalies

Given these facts, the question arises as to exactly how these patterns are accounted for. While the Onset constraint is no doubt the ultimate driving force in these anomalies, prosodic theory does not generally give any special status to an onsetless syllable in the same way that a heavy syllable has a special status.⁷ The hypothesis to be explored is that the Onset constraint directly causes onsetless vowel to have a special

⁷ But see Davis 1988 where such a proposal is made.

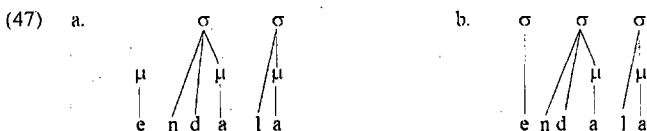
structural status. It is claimed that, in essence, onsetless vowels do not define proper syllables.

One possible tack to take in explaining the loss of the pre-prefixal H tone and the lack of vowel length before the sequence N+C in *endála* 'leopard' would be to assume that the Onset constraint prohibits the initial vowel from being parsed into a syllable, and thus the word has the following representation.

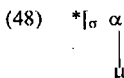


The problem with this approach is that it violates the commonly assumed principle (Ito 1986) that segments which are not licensed by affiliation into prosodic structure are deleted, so given (46), if such a principle is universal the unattached vowel *e* would incorrectly be deleted.

To avoid this theoretical problem, we will consider approaches employing non-canonical prosodic structures for onsetless vowels. Two candidates stand out, drawing on the theories of anomalous syllables proposed by Downing (1993) and Piggott (1995) in dealing with unrelated phenomena. Following Downing (1993) it might be assumed that such initial vowels are moraically licensed but do not constitute syllables, as in (47a). Or, following Piggott (1994) one could postulate that such vowels define syllables which have no moraic value as in (47b).



Both representations avoid violation of the Onset constraint, given in (48) in moraic terms.

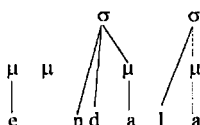


Under the moraic non-syllabic theory (47a) the initial vowel has no syllable so no violation of the Onset constraint results. Under the syllabic non-moraic theory (47b), the vowel has a syllable, but the first element in the syllable is not moraic. Either way, the

resulting structure does not have the configuration banned in (48). At the same time, the vocalic segment is prosodically licensed.

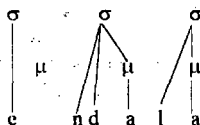
Now consider how these structural accounts might explain the fact that onsetless vowels cannot be long; as shown in section 3, a mora deriving from a preconsonantal nasal which would otherwise cause lengthening of the vowel fails to cause lengthening if the vowel is onsetless. As indicated in (49), the moraic nonsyllabic theory treats onsetless vowels as being licensed by a mora, but that mora is not part of a syllable, and on the assumption that compensatory lengthening involves docking a floating mora to an existing syllable, there is no syllable node for the nasal's mora to attach to, hence there is no compensatory lengthening.⁸

(49)



The syllabic non-moraic theory in (50) would block the affiliation of the nasal's mora with the syllable, since linking that mora to the syllable would create a regular syllable and therefore a violation of the Onset constraint, so the only way to avoid the onset violation is to prohibit all moraic structure, which blocks transfer of the nasal's mora.

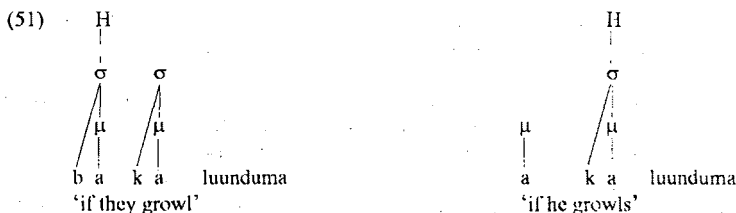
(50)



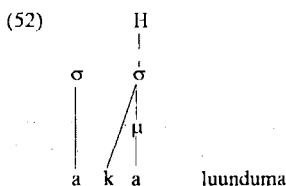
Thus both structural accounts can explain lack of lengthening in an onsetless vowel.

Moving to the fact that onsetless vowels are not proper tone-bearers, both models can provide an explanation for this fact. As discussed in Odden (1994), there are a number of reasons for linking tones to syllables rather than moras in Kikerewe, and it will therefore be assumed that tones link to syllables in Kikerewe. Under the moraic nonsyllabic account in (51), the failure of onsetless vowels to bear tone follows from the structural property that such vowels have no syllable nodes, so tones cannot dock to them.

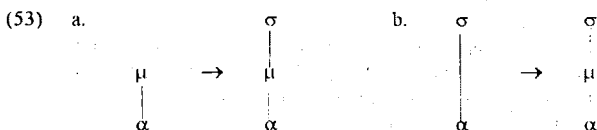
⁸ Another consideration may be called on to block bimoraic unsyllabified vowels. It is often assumed (Zec 1988) that one mora of a long vowel is the head mora and the other is a non-head mora. If the head-nonhead distinction is a property of the relation between syllables and moras, no such distinction can be maintained for an unsyllabified mora. It is therefore reasonable to assume that unsyllabified moras cannot serve to define a long vowel, since they cannot enter into the head/non-head contrast which defines a long vowel.



The syllabic nonmoraic account in (52) would assume a principle that although the tone structurally links to the syllable, it is the mora which is responsible for syllabic licensing, and therefore a syllable can bear tone only if it has a mora. Again there is a structural representation of the exceptional status of onsetless syllables with respect to tone.



Thus it would seem that attributing a special quasi-syllable status to onsetless vowels will resolve these two anomalies. However there are details that must still be accounted for. The first is the fact that onsetless vowels actually can be tone bearers, at least as far as the phrase-level throwback of final H tone is concerned. This could be remedied by assuming a postlexical syllable-fixing process which either assigns full syllable status to a vocalic mora as in (53a) or assigns a mora to the syllable in (53b), despite the violation of the Onset constraint.



Another explanation for these facts will be considered momentarily.

The second problem has to do with the asymmetry between an onsetless vowel which is underlyingly followed by a vowel, where there is glide formation without compensatory lengthening, versus a sequence composed of an onsetless vowel followed by a vowel in a derived representation, where the second vowel is made onsetless by deletion of *y*. Recall that in the latter case there is compensatory lengthening.

- (54) o-a-bala → wabala 'you counted'
 o-yétá → oétá → wéétá 'you called'

The question is how one accounts for compensatory lengthening in *wéétá*. Under the moraic nonsyllabic theory, one could account for this distinction through a derivational difference, where one first constructs a monomoraic CV syllable out of a V-V sequence by core syllabification based on the underlying form. A mora, but not a syllable, will be assigned to the initial vowel in *oyeta*. Subsequently, *y*-deletion eliminates the *y*, which creates an onset violation that is repaired by glide formation. There is compensatory lengthening in this kind of V-V sequence, since the initial vowel does have a mora.

- (55) o-a-bala

o-yeta

underlying



*core syllabification,
morification*



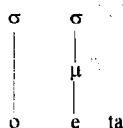
y-deletion



Glide formation, CL

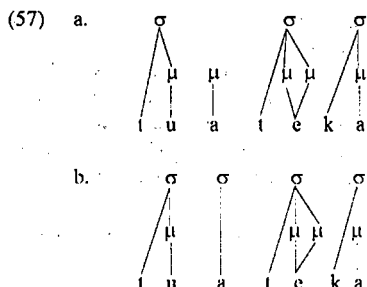
The form *wéétá* is more problematic for the syllabic nonmoraic account. Under the assumption that onsetless vowels are amoraic, there should be no compensatory lengthening since the initial vowel ought to have no mora.

- (56)



The final problem has to do with the fact that there is compensatory lengthening in *twaatééká*. Under the assumption that onsetless vowels do not have regular syllable

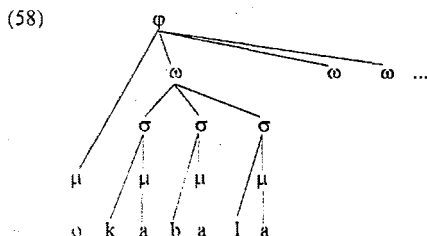
status, we would expect either the representation (57a) for the moraic nonsyllabic theory or (57b) for the syllabic nonmoraic theory.



As noted previously, a problem faced by the nonmoraic theory is that *a* should have no mora, so there would be no explanation for the long vowel.

A significant problem faced by both accounts is that they provide no explanation for why there should be syllable merger in the first place. In particular, glide formation and vowel merger could not be explained as they are elsewhere on the basis of the fact that these restructurings eliminate violations of the Onset constraint. Under either account in (57), the vowel *a* does not actually violate the Onset constraint, and therefore there would be no reason to restructure the prosodic properties of that vowel. To preserve the explanation for syllable fusion, we must constrain degenerate syllables so that they do not exist word internally — in fact, they will be allowed only at the beginning of the utterance, which is to say that degenerate syllables are subject to a peripherality constraint. This suggests another device will be useful in accounting for the special properties of onsetless vowels, that is, they might be extraprosodic.

A solution to the positional limitation on the special structure of asyllabic vowels in the moraic nonsyllabic theory is based on structural limits on extraprosodicity. Following Inkelas (1989), Downing (1995), it is assumed that an extraprosodic element is one that is contained within the morphological constituent which forms the basis for constructing a given prosodic domain, but which is not a member of that prosodic constituent. For Kikerewe, it is assumed that prosodic words may only dominate syllables. The postlexical phrase that organises sequences of words dominates only words (at least preferentially). However, a phrase can also dominate a mora, as in (58).



8. Conclusions

REFERENCES

- CLEMENTS, G.N. AND SAMUEL J. KEYSER. 1983. CV phonology: a generative theory of the syllable. Cambridge: MIT Press.
- DAVIS, STUART. 1988. Syllable onsets as a factor in stress rules. *Phonology* 5.1-19.
- DOWNING, LAURA. 1993. Unsyllabified vowels in Aranda. *Chicago Linguistic Society* 29.171-185.
- . 1994. SiSwati verbal reduplication and the theory of Generalized Alignment. *NEI S* 24.81-95.

⁹ Unless a postlexical syllable-formation process is assumed which assigns full syllable status to an unsyllabified mora, this would entail that H tones link *preferably* to syllables, but may directly link to a mora if no syllable node is available.

- . 1995. On the prosodic misalignment of onsetless syllables. Philadelphia: University of Pennsylvania, MS.
- HYMAN, LARRY. 1985. A theory of phonological weight. Dordrecht: Foris.
- INKELAS, SHARON. 1989. Prosodic constituency in the lexicon. Stanford: Stanford University dissertation.
- Ito, JUNKO. 1986. Syllable theory in prosodic phonology. Amherst: University of Massachusetts dissertation.
- . 1989. A prosodic theory of epenthesis, *Natural Language and Linguistic Theory* 7.217-259.
- JAKOBSON, ROMAN. 1962. Selected writings 1: Phonological studies. Second expanded edition. The Hague: Mouton.
- KIM, NOJU. 1995. Five types of segmental-prosodic rules that affect the tone bearing unit of North Kyungsang Korean. to appear in *Japanese-Korean linguistics volume 5*.
- M'CARTHY, JOHN, and ALAN PRINCE. 1993. Prosodic morphology. Amherst and Camden: University of Massachusetts and Rutgers University, MS.
- ODDEN, DAVID. 1994. Tone spread in Kikerewe. Paper presented at the 25th Annual conference on African linguistics, Rutgers University.
- . 1995. The phonology and morphology of Kimatuumbi. Oxford: Oxford University Press.
- PIGGOTT, GLYNN. 1995. Epenthesis and syllable weight. *Natural Language and Linguistic Theory* 13.283-326.
- ROSENTHALL, SAM. 1994. Vowel/glide alternations in a theory of constraint interactions. Amherst: University of Massachusetts dissertation.
- STERIADE, DONCA. 1982. Greek prosodies and the nature of syllabification. Cambridge: MIT dissertation.
- ZEC, DRAGA. 1988. Sonority constraints on prosodic structure. Stanford: Stanford University dissertation.